

Appl. No. 10/749,338
Amdt. Dated July 22, 2005
Reply to Office Action of Apr. 22, 2005

Amendments to the Specification

Please replace paragraph [0004] with the following amended paragraph:

[0004] Taiwan Patent Publication No. 486101 issued on May 1, 2002 discloses a backlight system, which is represented in Figure [[7]] 8. The backlight system 100 generally comprises a prism layer 130, a diffusion plate 120, a light guide plate 110, and a linear light source 140. The linear light source 140 is arranged at a side of the light guide plate 110. The prism layer 130 comprises first and second prism plates 131, 133. Light beams from the light source 140 are directed to emit from a surface of the diffusion plate 120 via the light guide plate 110. The emitted light beams eventually penetrate the prism layer 130.

Please replace paragraph [0008] with the following amended paragraph:

[0008] In order to achieve the above objectives, a light guide plate in accordance with the present invention generally includes a transparent plate with a plurality of hemispherical embossments formed thereon continuously side-by-side in rows and columns. The transparent plate includes a light emitting surface and a bottom surface opposite to the emitting surface. The embossments face in a direction away from the transparent plate.

Please insert the following new paragraph between paragraph [0017] and paragraph [0018]:

[0017.1] Figure 7 is a top elevation of a light guide plate according to an alternative embodiment of the present invention, showing a distribution of optical embossments on an emitting surface of the light guide plate;

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Please replace paragraph [0018] with the following amended paragraph:

[0018] Figure [[7]] 8 is an exploded, side elevation of a conventional backlight system.

Please replace paragraph [0019] with the following amended paragraph:

[0019] Referring to Figures 1, 2 and 3, a light guide plate 200 in accordance with a preferred embodiment of the present invention includes a transparent plate 220 on which a plurality of identical optical embossments 240 [[is]] are formed. The transparent plate 220 is generally a flat panel made from polymethyl methacrylate (PMMA). The transparent plate 220 includes an incident surface 222, an emitting surface 224, and a bottom surface 226. The incident surface 222 faces a light source (not shown in the figures), and receives light beams from the light source. The introduced light beams from the incident surface 222 are then directed to and emitted from the emitting surface 224. The incident surface 222 is perpendicular to the bottom surface 226, while the emitting surface 224 is opposite to the bottom surface 226.

Please replace paragraph [0020] with the following amended paragraph:

[0020] The embossments 240 are evenly distributed on the emitting surface 224, and are integrally formed with the transparent plate 220. The embossments 240 are generally hemispherical or partially hemispherical, and face outwardly away from the emitting surface 224. That is, a curvature of each embossment 240 is equal to or less than 180 degrees. In the preferred

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embodiment, the embossments 240 are arranged a distance away from each other. In an alternative embodiment, [[the]] embossments [[240]] 540 of a light guide plate 500 may be arranged on an emitting surface 524 continuously side-by-side without any space therebetween in rows and columns, as shown in Figure 7. Each In the preferred embodiment each embossment 240 includes a curved surface 242, which diffuses most light beams coming from the incident surface 222. In addition, the embossment 240 diffuses light beams diffused or reflected from the bottom surface 226. As a result, the light beams introduced into the light guide transparent plate 220 are evenly emitted from the emitting surface 224.

Please replace paragraph [0021] with the following amended paragraph:

[0021] Referring to Figures 2 and 4, the bottom surface 226 is provided with a plurality of identical dots 260. The dots 260 diffuse light beams coming from the incident surface 222 of the light guide transparent plate 220, so that the light beams are evenly emitted from the emitting surface 224.

Please replace paragraph [0022] with the following amended paragraph:

[0022] The dots 260 are generally hemispherical or partially hemispherical, and are evenly distributed on the bottom surface 260 of the light guide transparent plate 220. The dots 260 help diffuse complete reflection of the light beams within the light guide transparent plate 220. That is, incident light beams traveling to the dots 260 are diverted so that they emit from the emitting surface 224 of the light guide transparent plate 220 instead of being reflected therefrom. The dots 260 are generally hemispherical, and face outwardly away from the bottom surface 226. In the preferred

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embodiments, a radius of each dot 260 is larger than a radius of each embossment 240.

Please replace paragraph [0023] with the following amended paragraph:

[0023] Referring to Figure 5, a light path within one embossment 240 is shown. If there were no embossment 240, a light beam 300 diffused and reflected from the bottom surface 226 would emit from the emitting surface 224 at an angle β , assuming that an incident angle α of the light beams 300 is less than a complete reflection angle. However, by the provision of the embossment 240 on the emitting surface 224, the light beam 300 is first completely reflected at the curved surface 242, and then is incident into the curved surface 242 at an angle γ . If the angle γ is smaller than the complete reflection angle, then the light beam 300 is emitted from the curved surface 242 at an angle ε . The light beam 300 travels from a medium of high refractive index, in which the refractive index is larger than 1, into the medium of air which has a relatively low refractive index of 1. The reflective formula is

$$n = \sin i / \sin \omega.$$

wherein

n is the refractive index of the high reflective media, which is larger than 1;

i is the emitting angle; and

ω is the incident angle.

As can be understood from Figure 5, in comparing the angles of the light beam 300 emitting from the curved surface 242 and the emitting surface 224, it is apparent that unlike the emitting surface 224 of the ~~light-guide transparent plate 220~~, the curved surface 242 of the embossment 240 diffuses the light beam 300 having the incident angle α covering a certain range. The incident angle α is determined by the refractive index of the PMMA

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and the curvature of the curved surface 242. Further, for a given diameter L, when the curvature of the curved surface 242 increases, the overall height D of the embossment 240 increases correspondingly. The angle ϵ increases correspondingly, and the diffusion effect is even more pronounced.